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Specification and Drawings, as originally filed, with Application for Patent Serial No:  
**2,399,740**, on August 26, 2002, by **YVAN FORTIN**, for "Universal Teeth Prosthesis and  
Method of Manufacture Thereof."

*Tracy Aulhues*  
Agent certificateur/Certifying Officer

September 25, 2003

Date

Canada

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**UNIVERSAL TEETH PROSTHESIS AND METHOD OF MANUFACTURE  
THEREOF**

**5 FIELD OF THE INVENTION**

The present invention relates to an improved teeth prosthesis for an upper maxilla or a lower maxilla, and more particularly to a new design of a triple structure teeth prosthesis permitting an improved precision over existing  
10 prostheses. Moreover, this new design will allow most dental laboratories to use the technology described herein.

**BACKGROUND OF THE INVENTION**

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It is well known in the art to provide a teeth prosthesis for a lower or an upper maxilla, the teeth prosthesis being of the type comprising an infrastructure, a suprastructure and means for removable attachment of the suprastructure with the infrastructure.

20 More particularly, US patents 5,429,505 (FORTIN) and 5,674,070 (FORTIN), which is a continuation-in-part of US patent 5,429,505, relate to a teeth prosthesis, a method of manufacture thereof and a method for mounting and removing a suprastructure thereof. These patents disclose a teeth prosthesis for an upper maxilla including an infrastructure, a suprastructure, and an assembly for  
25 removable attachment of the suprastructure with the infrastructure. The infrastructure includes at least three implants, one connection bar, and an assembly for removably fastening the connection bar with and against the head of each of the implants. The suprastructure includes a first member made of cast metal or alloy having an intrados provided with an opening giving access to a  
30 housing of such size and depth to allow the housing of the connection bar therein, a second member permanently attached to the first member, and a set of teeth fixed to the first member and the second member. The assembly includes two first

fastening members, and a second fastening member. The invention is also directed to a method for the manufacture of such a teeth prosthesis.

However, even though aforesaid prior art teeth prosthesis can perform correctly when installed on the lower or the upper maxilla, the different elements of the teeth prosthesis have to be specifically machined to fit in the user's mouth. This machining involves a very high production cost because each element of the prosthesis must be customised for each user. Moreover, the involved machining procedure is very complicated and it has been demonstrated that the manufacture of such a teeth prosthesis is extremely difficult from a technical point of view. Furthermore, if a user loses an implant, it is actually quite difficult and expensive to replace it, or even impossible with appropriate precision, since all elements are customised. In most cases, the whole assembly must be replaced.

Therefore, there is a need to provide a teeth prosthesis wherein most of the elements are not customised, but are standard. This would allow supplying a more accurate teeth prosthesis to the user at an equivalent or cheaper cost. Moreover, this would also allow providing such a new technology available for most dental laboratories. Furthermore, since the elements of the prosthesis are not customised parts, it would be faster and cheaper to repair the teeth prosthesis with the same precision as the existing prosthesis.

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### SUMMARY OF THE INVENTION

An object of the present invention is to provide a teeth prosthesis which is more flexible and accessible.

Another object of the present invention is to provide a teeth prosthesis wherein elements can be replaced with substantially the same precision in case a break occurs.

More specifically, the invention relates to a triple structure teeth prosthesis on which a member having a set of teeth can be mounted. The teeth prosthesis comprises at least three implants but preferably not more than seven, each

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implant having opposite ends, one end of each implant being anchored in a bone of a maxilla while an opposite end projects out of a gingiva and defines a head. The teeth prosthesis also comprises a connecting bar being shaped and sized to be substantially facing the gingiva for attachment to the implants. The connecting  
5 bar has a top surface which is flat. The teeth prosthesis also comprises a meso-bar being shaped and sized to be substantially facing the connecting bar and fastened thereto. The teeth prosthesis is also provided with a hollow shaped iso-bar being adapted to receive the meso-bar therein, and two attaching devices for fastening the iso-bar onto the meso-bar.

10 The invention further relates to an attaching device for fastening an iso-bar onto a meso-bar, which is also manufactured with 5 microns precision for allowing an appropriate attachment of each element regarding the others.

The present invention and its advantages will be better understood upon reading of preferred embodiments thereof with reference to appended drawings.

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#### **BRIEF DESCRIPTION OF THE DRAWINGS**

A detailed description of preferred embodiments will be given herein below  
20 with reference to the following drawings, in which like numbers refer to like elements:

Figure 1 is a perspective view of a connecting bar onto which a meso-bar is mounted according to the present invention.

Figure 2 is a perspective view of a connecting bar according to the present  
25 invention.

Figure 3 is an exploded perspective view of a meso-bar and an iso-bar of an universal teeth prosthesis according to the present invention.

Figures 4, 5 and 6 are perspective views of a meso-bar of an universal teeth prosthesis according to the present invention.

30 Figure 7 is a top view of a meso-bar of an universal teeth prosthesis according to the present invention.

Figures 8, 9 and 10 are perspective views of an iso-bar of an universal teeth prosthesis according to the present invention.

Figure 11 is a top view of an iso-bar wherein a meso-bar is fitted into.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figures 1, 2 and 3, there is shown the different elements of a triple structure teeth prosthesis 1 according to the present invention. The triple structure teeth prosthesis 1 comprises at least three implants 2 (as shown in Figure 1), each implant 2 having opposite ends, one end of each implant being anchored in a bone of a maxilla while an opposite end protudes out of a gingiva and defines a head. The teeth prosthesis 1 also comprises a connecting bar 4 shaped and sized to be substantially facing the gingiva and fastened to the implants 2. The teeth prosthesis 1 also comprises a meso-bar 6 shaped and sized to be substantially facing the connecting bar 4 and fastened thereto. The teeth prosthesis 1 is also provided with a hollow shaped iso-bar 8 being adapted to receive the meso-bar 6 therein, and attaching devices 10 (as shown in Figure 3) for attaching the iso-bar 8 to the meso-bar 6. An element having a set of teeth mounted thereon (not shown) can be mounted onto the triple structure teeth prosthesis 1 as known in the art, and more particularly in US patent 5,674,070.

More specifically, as can be appreciated on Figures 1 and 2, the connecting bar 4 is a very thin structure which is attachable to the maxilla. The connecting bar 4 is provided with an extremely flat top part 30. The teeth prosthesis 1 is provided with a plurality of implants 2, preferably four to six, which are anchored in the bone of the maxilla for fastening the connecting bar 4 with the maxilla. The mechanism for fastening the connecting bar 4 with the implants 2 are well known in the art.

Referring now to Figures 4 to 7, the meso-bar 6 has substantially the same shape as the connecting bar 4 (as better seen in Figure 1) and comprises a fore part 16 and two opposite rear ends 18, 20. The meso-bar 6 is provided with a set of support points 12 for supporting the iso-bar 8. The iso-bar 8 is also provided

with a set of support points 13 (as shown in Figure 11). The support points 12, 13 define an anterior and a posterior support point on each side of the meso-bar 6 and the iso-bar 8. The meso-bar 6 is also provided with a plurality of fixation holes 28 and is rigidly attached onto the connecting bar 4 with at least four fasteners 14, possibly five or six, inserted and secured in the fixation holes 28. For example, screws may be used to do so. If needed, other convenient fixation holes may be drilled in the meso-bar 6.

Referring now to figures 8 to 11, the iso-bar 8 has substantially the same shape as the meso-bar 6 and is provided with a fore part 22 and two opposite rear ends 24, 26. The iso-bar 8 is hollow and has a predetermined size and depth to receive the meso-bar 6 therein (as shown in Figure 11).

Referring now to Figure 3, the attaching devices 10 for fastening the iso-bar 8 onto the meso-bar 6 are machined for providing a shape as precise as at least 5 microns. In the past, such attaching devices 10 were die cast and reached an precision of approximately 50 microns. Preferably, the attaching devices 10 comprises two posterior closure piston systems, as known in the art, but other convenient fasteners may be considered. These two attaching devices 10 are respectively attached with a corresponding rear end 24, 26 of the iso-bar 8 for removably attaching them with corresponding ends 18, 20 of the meso-bar 6. The set of support points 12 of the meso-bar 6 and the set of support points 13 of the iso-bar 8 allow the correct adjustment of both bars together.

Preferably, the connecting bar 4 is made of gold or palladium; and the meso-bar 6 and the iso-bar 8 are made of titanium. The attaching devices 10 are also preferably made of palladium, titanium or other materials.

The meso-bar 6 and the iso-bar 8 are provided in several predetermined sizes, preferably three, and are not custom made. The connecting bar 4 is the only customized part for allowing a correct adjustment thereof on the gingiva of the user. The top of the connecting bar 4 is machined to be extremely flat (as shown in Figure 2). Once the connecting bar 4 is attached to the maxilla, a technician uses a gauge based on the predetermined size and shape of the selected meso-bar 6 for drilling the screwing holes in the connecting bar 4 corresponding to the fixation

holes 28 of the meso-bar 6. The flatness of the top part 30 of the connecting bar 4 allows a very accurate adjustment of the gauge thereon. Since the meso-bar 6 is manufactured in factory and is provided in predetermined sizes, the positioning of the anchored critical points are then machined at a very high level of precision, such as 5 microns for the sets of support points 12, 13.

Consequently, the use of three structures instead of two as it was the case in the past avoids custom machining of each part of the teeth prosthesis, and thus, cuts down the cost of the replacement of lost part since most of parts are no longer custom-made.

Moreover, the use of three structures instead of two allows to greatly increase the accuracy of the positioning of each element regarding the others. More specifically, teeth prosthesis of the prior art reaches an accuracy of 25 to 50 microns for the positioning of the different elements while the present invention allows reaching at least 5 microns accuracy positioning.

Finally, the use of a three structure prosthesis, standard components and high accuracy renders the technology within the reach of dental laboratories, which was not the case in the prior art, given the exacting nature of custom made components.

While embodiments of this invention have been illustrated in the accompanying drawings and described above, it will be evident to those skilled in the art that changes and modifications may be made therein without departing from the essence of this invention. All such modifications or variations are believed to be within the scope of the invention.



**What is claimed is:**

1. A triple structure teeth prosthesis on which a member having a set of teeth is mounted, said teeth prosthesis comprising:
- 5
- at least three implants, each implant having opposite ends, one end of each implant being anchored in a bone of a maxilla while an opposite end projects out of a gingiva and defines a head;
  - a connecting bar being shaped and sized to be substantially facing the gingiva and fastened to said implants;
  - 10 - a meso-bar being shaped and sized to be substantially facing the connecting bar and fastened thereto;
  - a hollow shaped iso-bar being adapted to receive the meso-bar therein; and,
  - 15 - attaching means for attaching the iso-bar to the meso-bar.

FIGURE 1

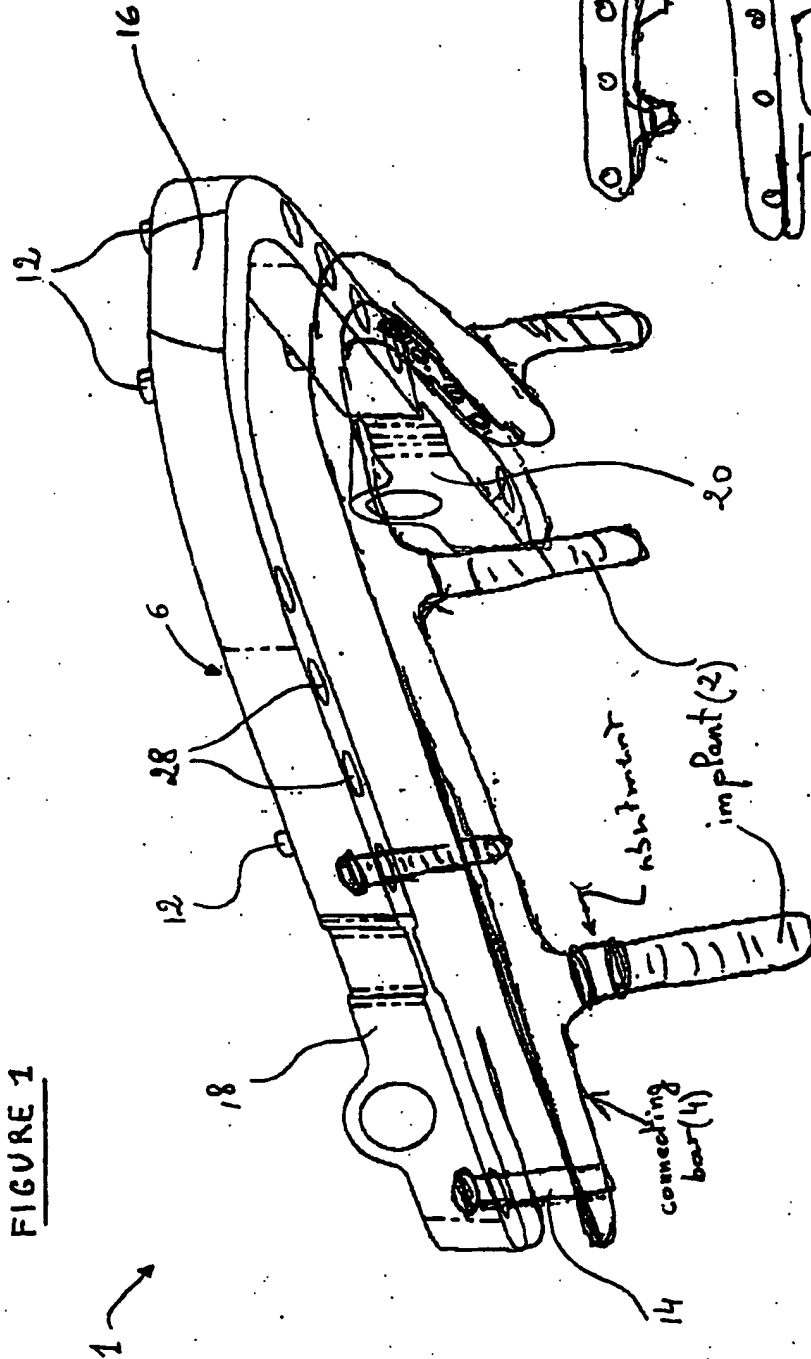


FIGURE 2

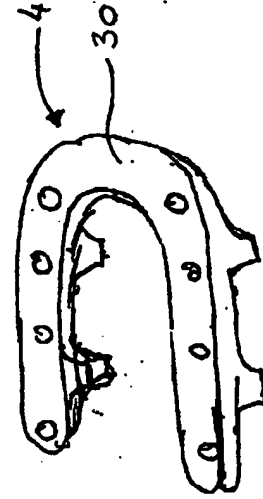


FIGURE 3

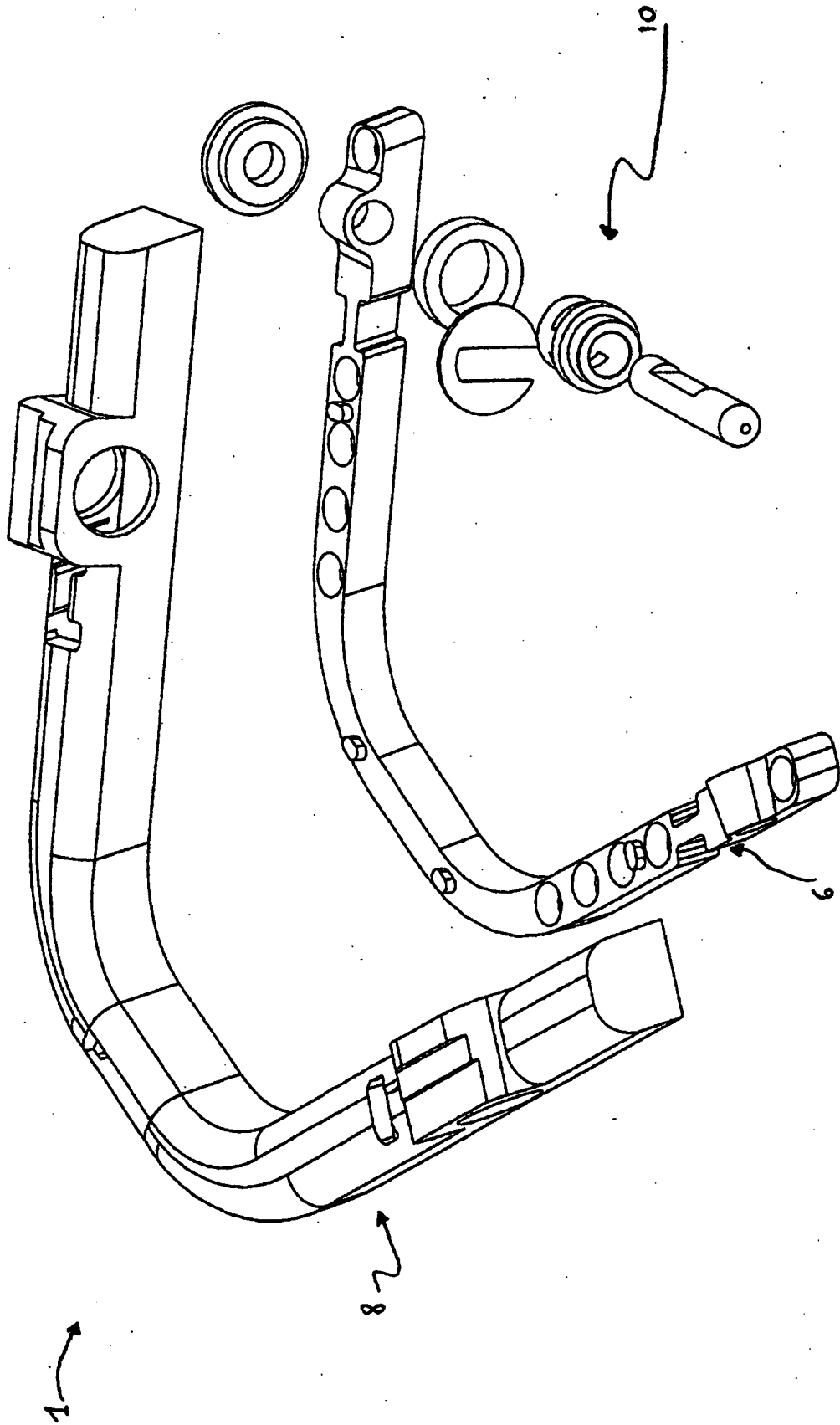


FIGURE 4

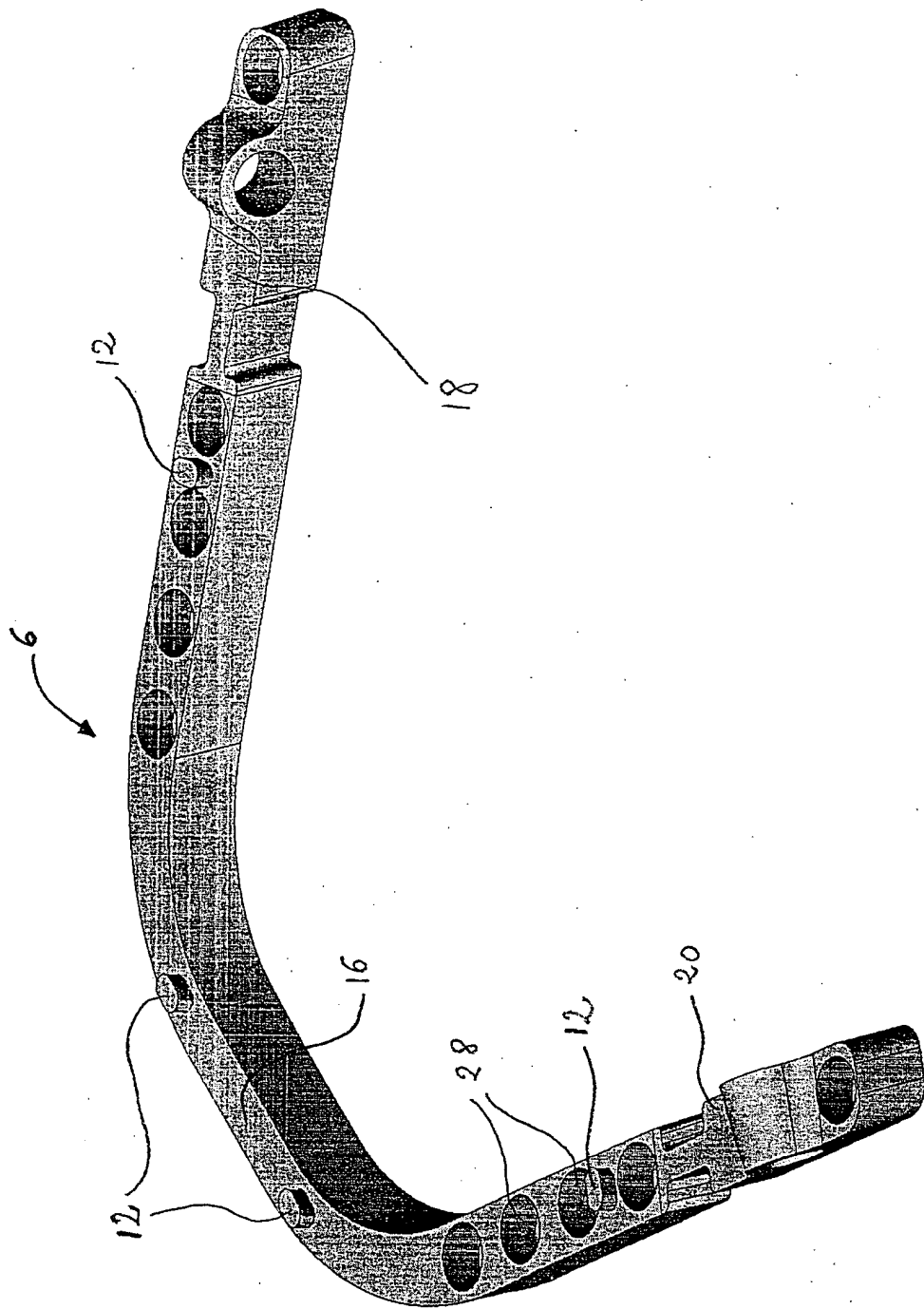
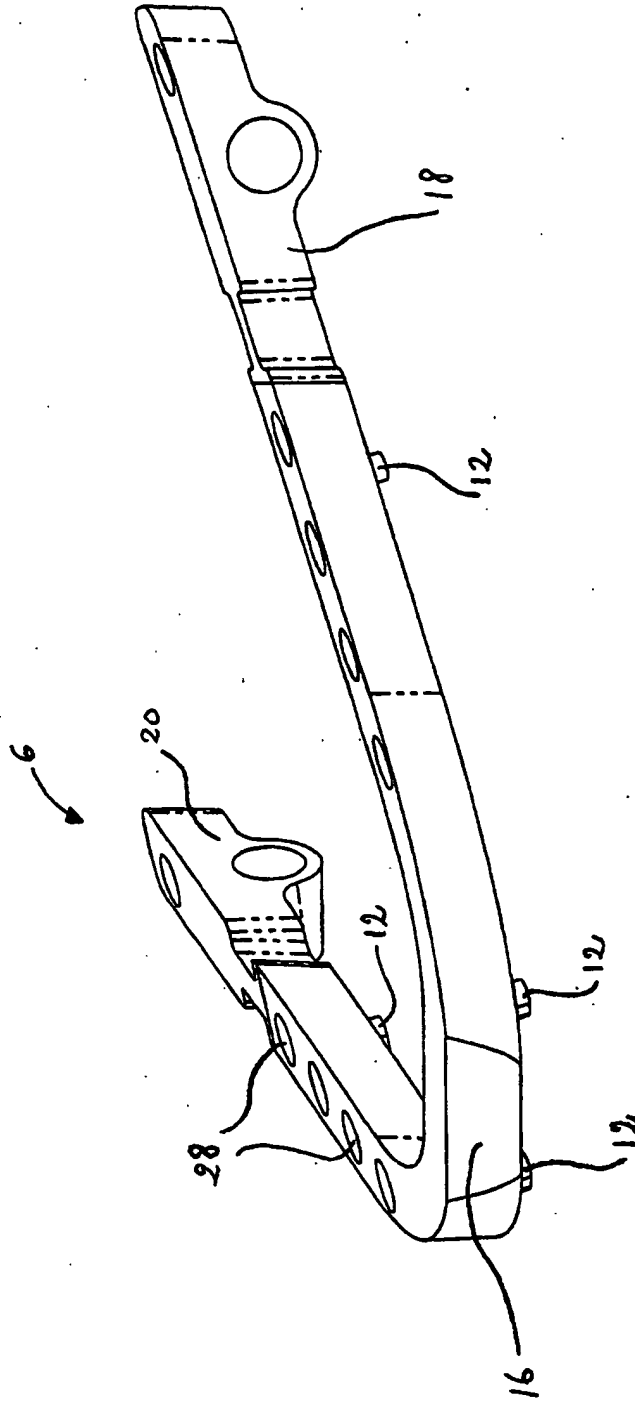
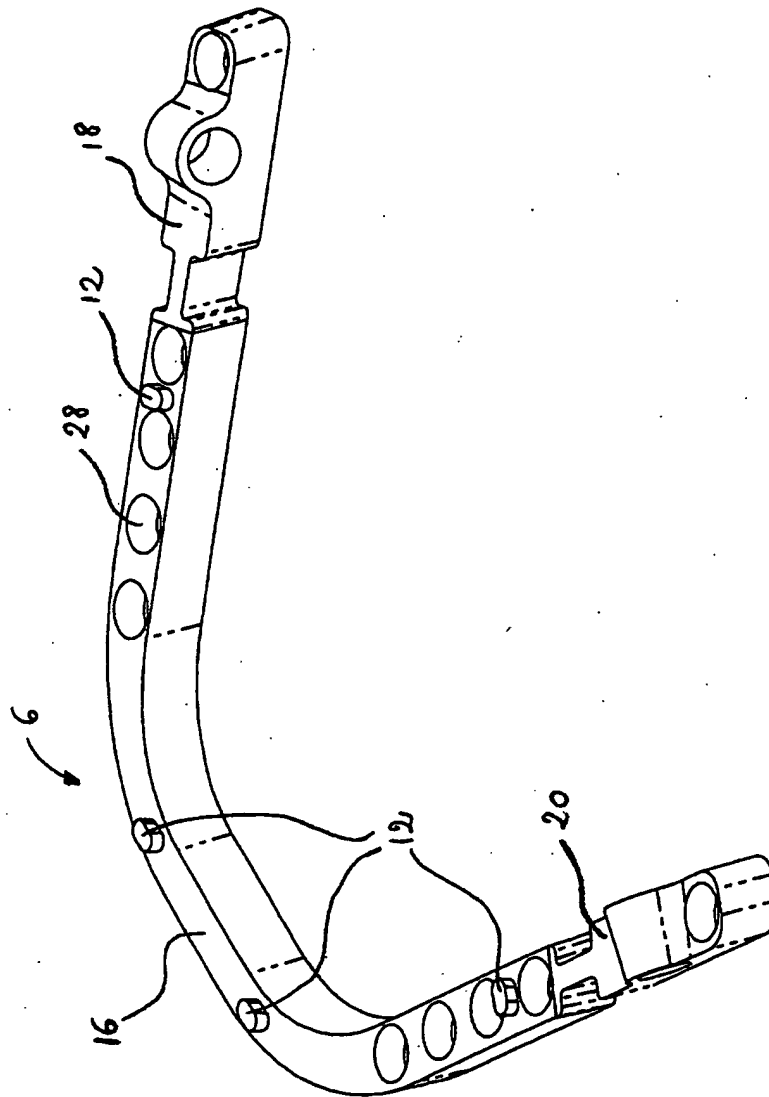


FIGURE 5



**FIGURE 6**



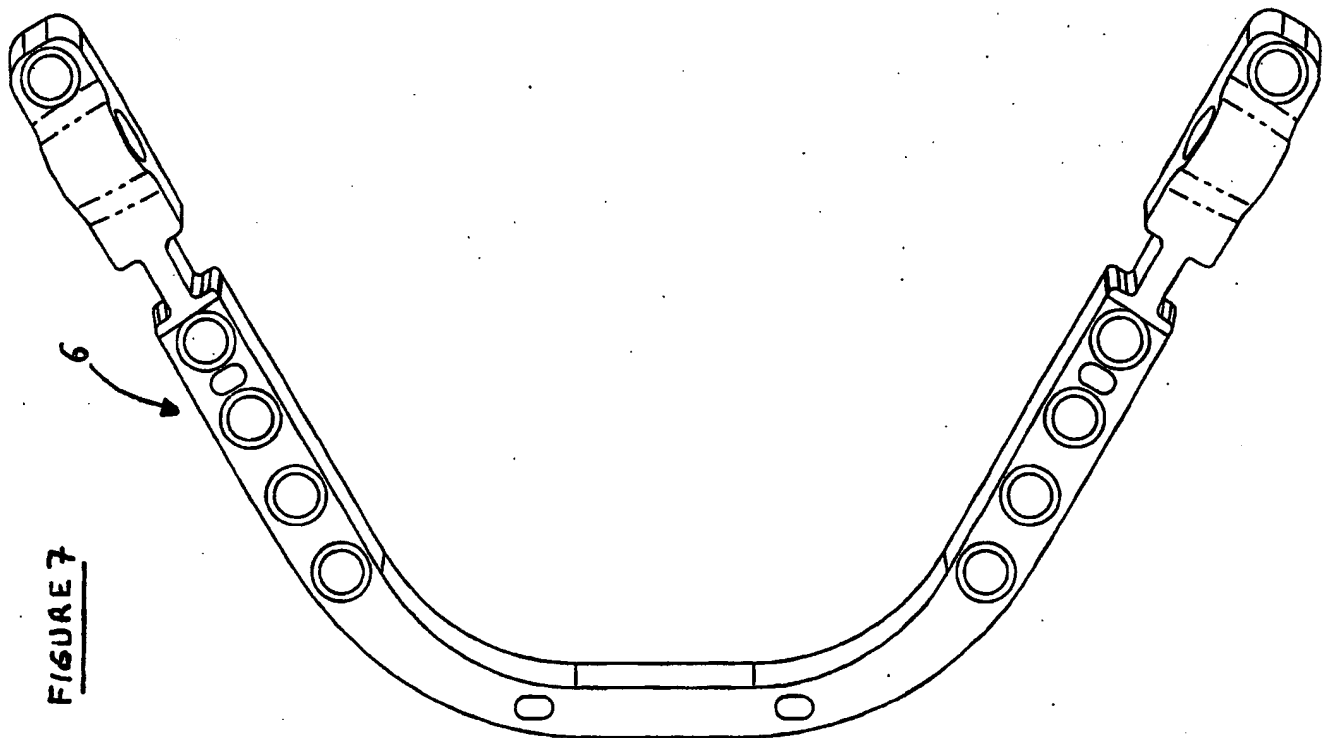


FIGURE 7

FIGURE 8

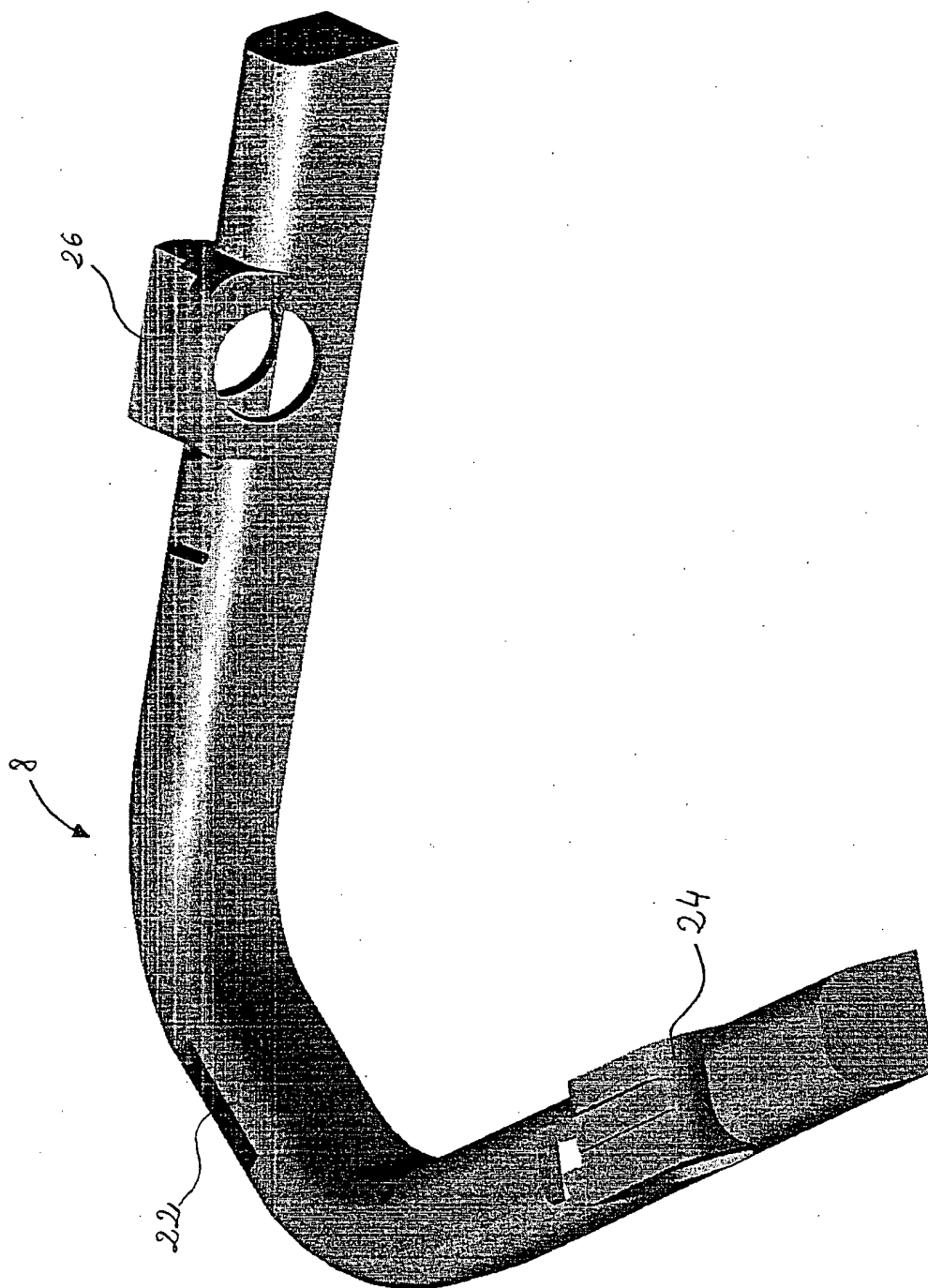




FIGURE 9

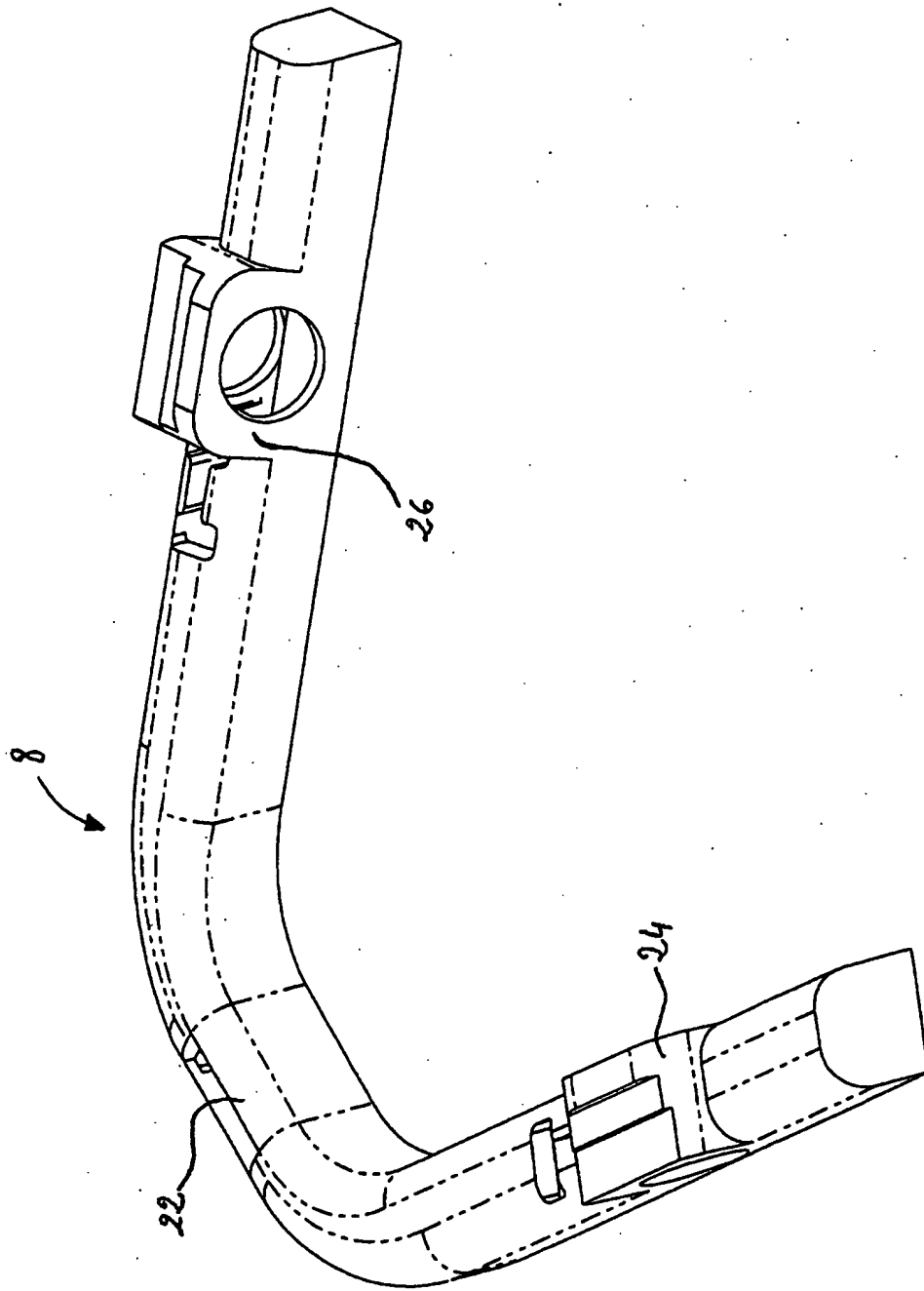


FIGURE 10

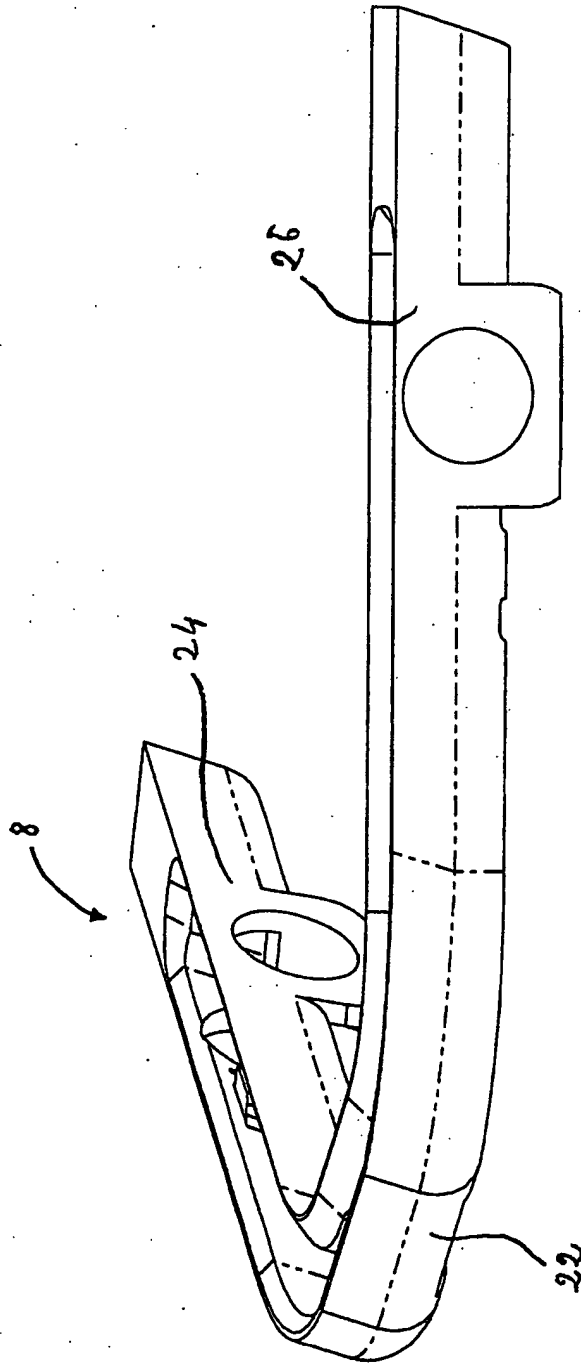


FIGURE 11

